

WHAT IS CLAIMED IS

1. A modulation device comprising:

5       a modulation unit that modulates data in a hierarchical manner using multiple types of modulation techniques; and

          a transmission unit that transmits the hierarchically modulated data.

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2. The modulation device according to claim 1, further comprising:

          a sampling pattern generating unit that generates a sampling pattern for each of the multiple types of

15 modulation techniques, the sampling pattern defining a sampling space for quantizing said data in accordance with each of said modulation techniques, wherein the modulation unit modulates said data in the hierarchical manner using a digital signal sampled based on the sampling pattern.

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3. The modulation device according to claim 2, wherein the sampling pattern defines the sampling space of a carrier used in one of multi-phase phase shift keying and multi-value quadrature amplitude modulation.

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4. The modulation device according to claim 2, wherein the transmission unit transmits the sampling pattern, together with the hierarchically modulated data.

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5. A demodulation device comprising:

a receiving unit that receives hierarchical modulation data having been subjected to hierarchical modulation using multiple types of modulation techniques; and

5 a demodulation unit that demodulates the hierarchical modulation data using a demodulation technique corresponding to a specific hierarchy of the hierarchical modulation data.

6. The demodulation device according to claim 5, wherein the  
10 demodulation unit is furnished with multiple types of demodulation techniques, the demodulation device further comprising:

a demodulation type selection unit that selects one of the demodulation techniques to be used for demodulation of  
15 the hierarchical modulation data, wherein the demodulation unit demodulates the hierarchical modulation data using the selected one of the demodulation techniques.

20 7. The demodulation device according to claim 6, wherein the demodulation type selection unit selects said one of the demodulation techniques in accordance with the traffic of a service area.

25 8. The demodulation device according to claim 6, wherein the demodulation type selection unit selects said one of the demodulation techniques in accordance with the propagation environment.

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9. The demodulation device according to claim 6, wherein the demodulation type selection unit selects said one of the

demodulation techniques in accordance with a service request.

10. The demodulation device according to claim 5, wherein  
5 the receiving unit receives a sampling pattern used for the hierarchical modulation, together with the hierarchical modulation data, and the demodulation unit demodulates the hierarchical modulation data using the sampling pattern.

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11. A modulation method comprising the steps of:

modulating data in a hierarchical manner using multiple types of modulation techniques to produce hierarchical modulation data; and

15 transmitting the hierarchical modulation data to a demodulator of a counterpart communication device.

12. The modulation method according to claim 11, further  
20 comprising the step of:

generating a sampling pattern for each of the modulation techniques, the sampling pattern defining a sampling space for quantizing said data in accordance with each of said modulation techniques, wherein said data are  
25 modulated in a hierarchical manner using a digital signal sampled based on the sampling pattern.

13. The modulation method according to claim 12, wherein the  
30 sampling pattern defines the sampling space of a carrier used in one of multi-phase phase shift keying and multi-value quadrature amplitude modulation.

14. The modulation method according to claim 12, further comprising the step of:

transmitting the sampling pattern together with the  
5 hierarchically modulated data.

15. A demodulation method comprising the steps of:

receiving at a demodulator hierarchical modulation data  
10 having been subjected to hierarchical modulation using multiple types of modulation techniques; and

demodulating the hierarchical modulation data using a demodulation technique corresponding to a specific hierarchy of the hierarchical modulation data.

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16. The demodulation method according to claim 15, further comprising the step of:

furnishing the demodulator with multiple types of  
20 demodulation techniques;

selecting one of the demodulation techniques to be used for demodulation of the hierarchical modulation data, wherein the hierarchical modulation data are demodulated using the selected one of the demodulation techniques.

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17. The demodulation method according to claim 16, wherein said one of the demodulation techniques is selected in accordance with the traffic of a service area.

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18. The demodulation method according to claim 16, wherein said one of the demodulation techniques is selected in

accordance with the propagation environment.

19. The demodulation method according to claim 16, wherein  
5 said one of the demodulation techniques is selected in  
accordance with a service request.

20. The demodulation method according to claim 15, further  
10 comprising the step of:  
receiving a sampling pattern used for the hierarchical  
modulation, together with the hierarchical modulation data,  
wherein the hierarchical modulation data are demodulated  
using the sampling pattern.

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